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INFLUENCE OF LEVEL AND TIME OF NITROGEN APPLICATION ON DIFFERENT GROWTH PARAMETERS IN BABY CORN (*ZEA MAYS* L)

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ABSTRACT

Nitrogen applied in 3 equal splits as 1/3 basal+ 1/3 knee height+ 1/3 pre tasseling Stages of baby corn resulted in significantly highest parameters of baby corn. Number of baby corn per plant is maximum at 90 kg N/ha i.e. 3.68 and minimum at 40 kg N/ha i.e. 1.56. In S_4 (1/3 basal+ 1/3 knee height+ 1/3 pre tasseling Stages) it is maximum i.e. 2.84. Regarding, interaction number of baby corn is maximum at S_4 and 90 kg N/ha. Green cob with husk weight is maximum (25.15 g) at 90 kg N/ha and also in S_4 i.e. 25.24 g. In case of interaction it is maximum at 90 kg N/ha and S_4 i.e. 32.19 g. Length of marketable baby corn is maximum at 90 kg N/ha and S_4 (9.64 cm). The marketable baby corn yield and baby corn with husk yield is maximum at nitrogen level 90 kg/ha i.e., 1398.98 kg/ha and 4642.17 kg/ha respectively. At schedule S_4 the marketable baby corn yield and baby corn with husk yield is 1380.03 kg/ha and 4403.24 kg/ha which is also highest . Green fodder yield is maximum at 90 kg N/ha and S_4 i.e., 32.87 t/ha and 28.19 t/ha respectively.

KEYWORDS: Nitrogen, Tassel, Knee Height, Basal

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Original Article

INTRODUCTION

Baby corn is an extremely easy crop to produce and is grown just like any other corn crop. It is not produced locally because hand labour is required for harvesting and processing, market prices are unknown, and consumers are unfamiliar with it as a fresh crop. However, locally produced fresh baby corn has several advantages such as it is superior in both taste and texture. Fresh baby corn has a crisp texture and a subtle, slightly sweet corn flavour. Although almost all the baby corn found in the United States is pickled or canned and imported from Asia, fresh baby corn is easy to grow in the Indian condition. Baby corn is no longer a delicacy or specialty food reserved for salad bars and Asian restaurants; it is a locally produced delicious treat to eat raw or cooked in many recipes. The tiny ears of baby corn are simply immature ears from regular-sized corn plants. Specialty varieties are available for baby corn production, but baby corn can also be harvested from many common corn varieties. Besides proteinaceous corn, plant can also be used as fodder for cattle's, which is also nutritious according to Galinat (2014). Since it's a less duration crop, it can be utilised in many intercropping system.

MATERIALS METHODS

The field experiment "Influence of level and time of nitrogen application on different growth parameters in baby corn (Zea mays L.)" was conducted in Uparjhar village of Bolangir district during kharif 2014. The experiment was conducted in Randomised Block Design with three replications. Twelve treatment combinations comprising three nitrogen levels (40, 60 and 90 Kg N/ha) and four schedules of nitrogen application:

S_1 ½ basal+ ½ knee height

S_2 1/3 basal+ 2/3 knee height

S_3 ½ basal+ ¼ knee height+ ¼ pre tasseling

S_4 1/3 basal+ 1/3 knee height+ 1/3 pre tasseling

Net plot size was 7.5mX4.8m, gross plot size was 8mX5m, seeds sown at a depth of 5 cm with a spacing of 40x20 cm, variety selected was G-5414 F_1 hybrid of Syngenta company, seed rate was 25 kg/ha. Phosphorous and potassium was applied at the rate of 60 kg and 40 kg per ha respectively. Gap filling and thinning operations was done at 7 DAS and 12 DAS respectively. Intercultural operations were done at knee height stage (25 DAS) and pre tasseling stage (40 DAS).

RESULTS AND DISCUSSIONS

The yield components viz., number of baby corn per plant, green cob along with husk fresh weight, length of marketable baby corn, baby corn yield and green fodder yield were higher under 90 kg N/ha along with application at different stages such as 1/3 basal+ 1/3 knee height+ 1/3 pre tasseling than rest of the fertilizer treatments. Significant improvement in growth parameters resulting in higher photosynthetic rate with more accumulation of dry matter reflected into better source sink relationship which in turn enhanced the yield attributes of baby corn. This is in confirmation with Bar-Zur and Schaffer (2013) and Galinat (2014) in baby corn.

There was significant difference between marketable baby corn yield at 40 kg N/ha and 90 kg N/ha. Discarded baby corn yield was maximum at 40 kg N/ha (220.12 kg/ha) and minimum at 90 kg N/ha (133.78 kg/ha). Similarly, regarding schedule of nitrogen application marketable yield of baby corn is maximum at S_4 (1380.03 kg/ha) and minimum at S_1 (1020.47 kg/ha). Increased and balanced application of N in 3 equal splits improved the nutritional environment of the soil solution leading to higher availability of nutrients to plants. This led to increased physiological and biochemical reaction in plants which enhanced the mobilization of nutrients towards sink along with photosynthates of baby corn. Higher N might have favoured greater source sink relation at appropriate period of crop growth resulting higher baby corn and green fodder yield. There was highly significant positive correlation between N uptake and baby corn yield as well as with green fodder yield. This is according to Jackson et al (2013) in sweet corn, Kotch et al (2011) in baby corn and Duncan (2010) in maize crop.

Higher yield of baby corn under 90 kgN/ha with 3 equal splits can be ascribed due to higher value for growth parameters like number of baby corn per plant, green cob along with husk fresh weight, length of marketable baby corn and green fodder yield with enhanced yield attributes and ultimately increased the yield of baby corn. This corroborates the findings of Suwannarit and Changsalug (2010) in baby corn.

Table 1: Effect of Level and Time of Nitrogen Application on Number of Baby Corns per Plant

Treatment	Number of baby corns/plant
Nitrogen level(kg/ha)	
40	1.56
60	2.23
90	3.68
SEM(±)	0.08
CD(P=0.05)	0.23

Table 1: Contd.,

Time of N application	
S1	2.10
S2	2.68
S3	2.69
S4	2.84
SEM(±)	0.09
CD**(P=0.05)**	0.27

Table 2: Interaction Effect between Level and Time of Nitrogen Application on Number of Baby Corns per Plant

N level(kg/ha) Time of N application	**40**	**60**	**90**
S_1	1.24	2.11	3.09
S_2	1.46	2.18	3.18
S_3	1.53	2.28	3.68
S_4	1.75	2.43	4.40
SEM	0.16		
CD(P=0.05)	0.45		

Table 3: Effect of Interaction Level and Time of its Application on Green Cob with Husk Fresh Weight (g)

Treatment	**Green baby Corn with Husk Fresh Weight(g)**
Nitrogen level(kg/ha)	
40	16.23
60	20.89
90	25.15
SEM(±)	0.84
CD(P=0.05)	1.92
Time of N application	
S1	18.32
S2	19.78
S3	21.23
S4	25.24
SEM(±)	0.82
CD**(P=0.05)**	2.39

Table 4: Interaction Effect between Level and Time of N Application on Green baby Corn with Husk Fresh Weight (g)

N level(kg/ha) Time of N application	**40**	**60**	**90**
S_1	14.61	16.68	19.93
S_2	14.90	18.41	24.67
S_3	14.77	21.61	25.83
S_4	16.33	24.83	32.19
SEM	1.37		
CD(P=0.05)	3.93		

Table 5: Interaction Effect between Level and Time of N Application on Green cob with Husk: Baby Corn Ratio

N level(kg/ha) / Time of N application	40	60	90
S_1	3.75	2.72	2.13
S_2	3.09	3.10	3.24
S_3	2.81	3.49	3.01
S_4	2.65	3.33	3.45
SEM	0.33		
CD(P=0.05)	0.97		

Table 6: Interaction Effect between Level and Time of N Application on Length of the Marketable Baby Corn (cm)

N level(kg/ha) / Time of N application	40	60	90
S_1	5.95	5.78	5.83
S_2	5.31	5.62	7.52
S_3	5.53	6.44	7.93
S_4	5.68	7.61	9.64
SEM	0.40		
CD(P=0.05)	1.16		

Table 7: Effect of Level and Time of N Application on Baby Corn Yield (kg/ha)

N level(kg/ha) / Treatment	Baby corn yield with husk	Marketable baby corn yield	Discarded baby corn yield
40	3465.23	921.90	220.12
60	4034.78	1058.45	179.87
90	4642.17	1398.98	133.78
SEM(±)	103.46	22.19	5.06
CD(P=0.05)	301.18	63.12	14.18
Time of N application			
S1	3721.27	1020.47	190.05
S2	3967.41	1119.62	185.16
S3	4099.14	1257.48	172.07
S4	4403.24	1380.03	164.34
SEM(±)	118.03	25.76	5.78
CD(P=0.05)	350.01	73.41	17.18

Table 8: Effect of Level and Time of N Application on Green Fodder Yield (t/ha) Baby Corn

Treatment	Green Fodder Yield
N level(kg/ha)	
40	15.92
60	19.99
90	32.87
SEM(±)	1.02
CD(P=0.05)	3.08
Time of N application	
S1	18.88
S2	22.27
S3	23.96
S4	28.19
SEM(±)	1.18
CD(P=0.05)	3.87

CONCLUSIONS

Based on the above discussion, it can be concluded that for higher number of baby corn per plant, green cob along with husk fresh weight, length of marketable baby corn, baby corn yield and green fodder yield, may be applied nitrogen at the rate of 90kg/ha in 3 equal split i.e. at 1/3 basal+ 1/3 knee height+ 1/3 pre tasseling would be most viable practice.

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